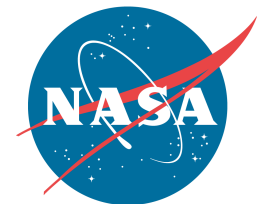


# Nanosensor-Cellphone Integration for Extended Chemical Sensing Network

Jing Li, Ph.D.  
Principal Investigator  
NASA Ames Research Center

Developed in partnership with the U.S.  
Department of Homeland Security Science &  
Technology Directorate.



# What is it?

## An integrated sensing system!

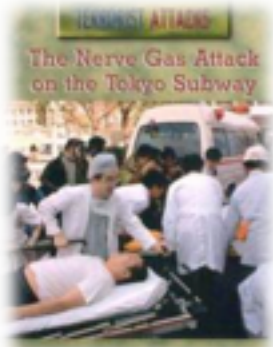


DHS S&T Cell-All



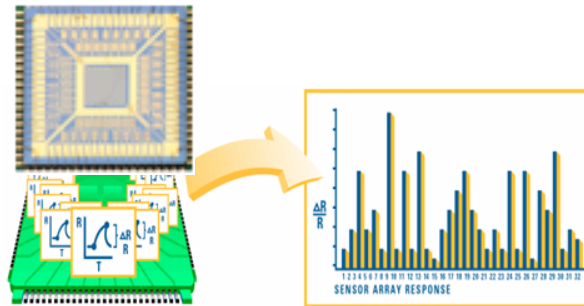
# NASA Nanosensor Technology

- 5 US patents and 14 publications



DHS funded to develop cellphone sensors for early warning of a hazardous event.

DHS S&T Cell-All



Using pattern matching algorithms, the data is converted into a unique response pattern

- Nanosensor – low power, small size, high sensitivity, highly integrated system
- NASA engineering – Nanosensors are space qualified, quick turn around prototyping

Government agencies leverage resources to develop technology for their own missions as well as to benefit the public.



NASA has invested 8 years to develop this nanosensor technology.

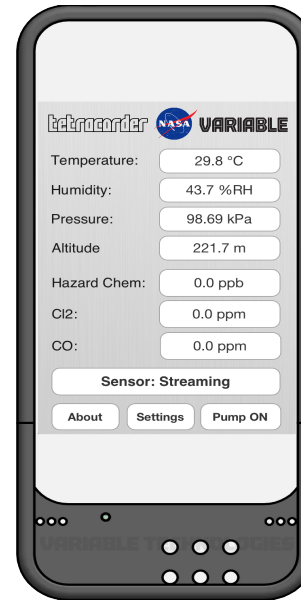
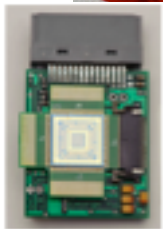


# Sensor-Phone Integration

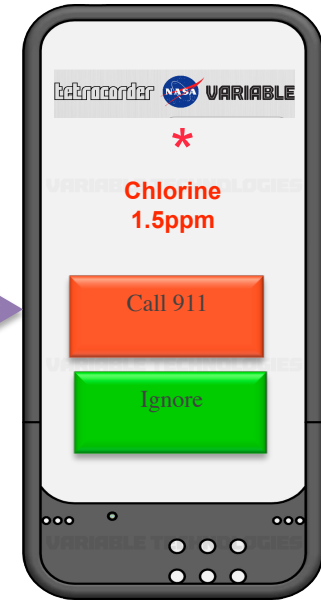
tetrocorder



- Chemical detection
- Temperature
- Pressure
- Humidity
- GPS



Algorithm



## Nanosensors:

- Sensitivity: ppm-ppb
- Power:  $\mu$ W –mW
- Response: seconds
- One button operation
- No consumables

## Hardware (sensing module):

- Gas sampling
- Data acquisition
- Data storage

## Software (App):

- Data processing
- Data transmission
- Command exchange
- Embedded intelligence

## Features:

- Self alert
- Network alert

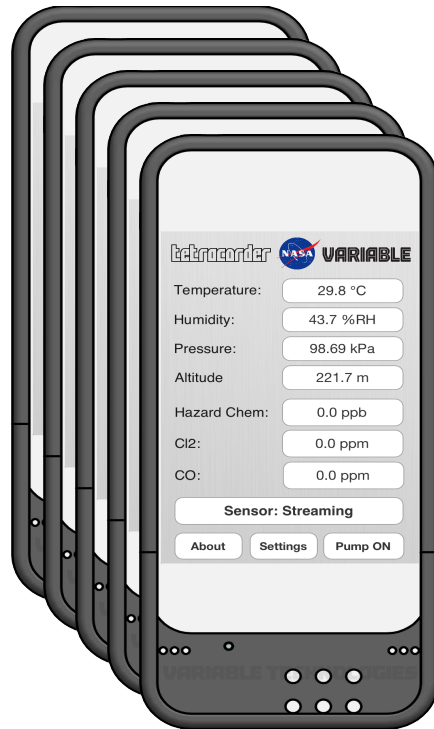
DHS S&T Cell-All

NASA Supported Small Business:  
Dr. George Yu, **VARIABLE TECHNOLOGIES**



# Extended Sensing Network

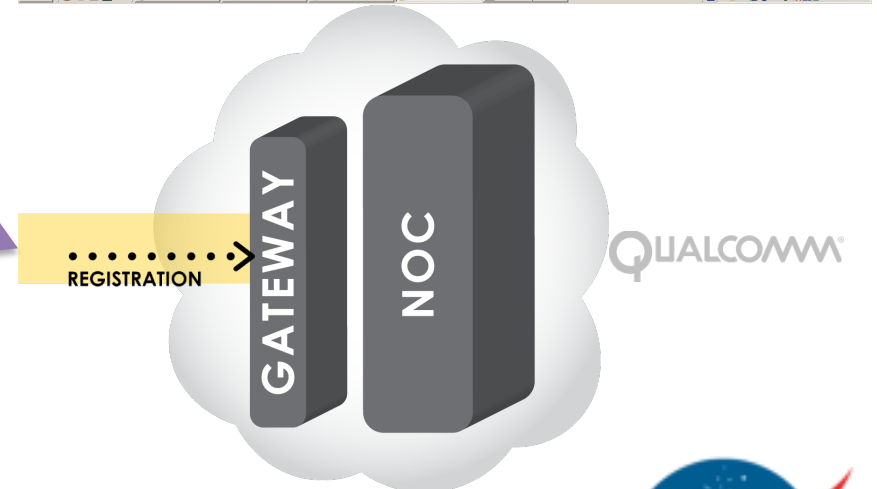
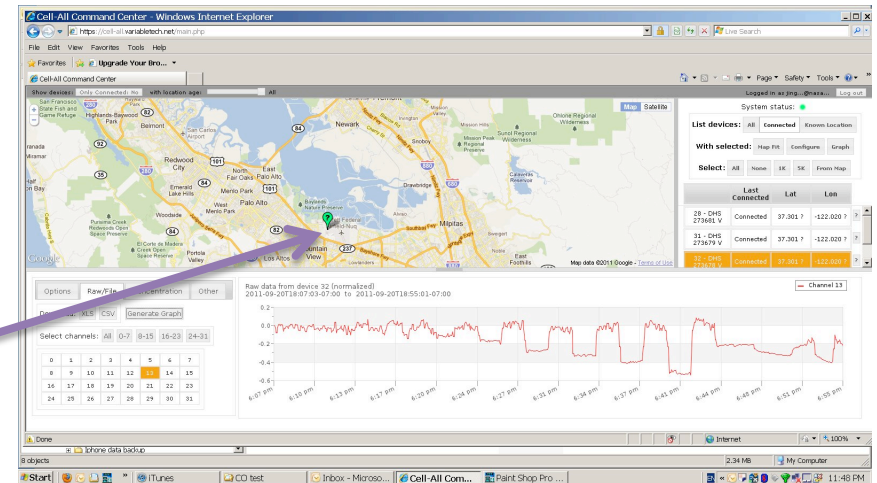
tetrocorder



Web Portal  
+  
Internet Server

Chemical info:  
ID & Concentration  
Temperature  
Pressure  
Humidity  
GPS location

NASA Cell-All Mission Control



DHS S&T Cell-All

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